

CALDER RESERVOIR



Introduction

Calder Reservoir is a small stabilized lake in the Diamond Mountain area northeast of Vernal. It is in the middle of a chain of three stabilized lakes on Pot Creek. Although it is in the Uinta Mountains, elevations are much lower in the eastern end of the range, so the area lacks the continuous coniferous forests of the central portion of

the

range. It is also known as Calder Pond or Zeph Calder Reservoir. It provides summer recreational opportunities.

Calder Reservoir was created in the 1970's by the construction of an earth-fill dam, and purchased by the DWR in 1978. The reservoir shoreline is mostly privately owned, but the west end and northeast corner are owned

Characteristics and Morphometry

Lake elevation (meters / feet)	2,223 / 7,291
Surface area (hectares / acres)	40 / 99
Watershed area (hectares / acres)	17,220 / 42,551 ²
Volume (m ³ / acre-feet)	
capacity	2,009,790 / 1,630
conservation pool	1,849,500 / 1,500
Annual inflow (m ³ / acre-feet)	
Retention time (years)	
Mean annual vertical fluctuation (meters / feet)	0.5 / 1.7
Depth (meters / feet)	
maximum	12 / 38
mean	5 / 17
Length (meters / feet)	1,375 / 4,510
Width (meters / feet)	400 / 1,310
Shoreline (meters / feet)	3,600 / 11,810

Location

County	Uinta
Longitude / Latitude	109 12 02 / 40 43 08
USGS Map*	Crouse Reservoir 1962
DeLorme's Utah Atlas & Gazetteer™	Page 56, B-4 - B-5
Cataloging Unit	(14060001)
* Reservoir not on map. Clearly seen on USGS Dutch John 1:100,000 map	

by the BLM. Public access is unrestricted. Reservoir water is owned by the DWR for non-consumptive use as cold-water aquatic habitat and a recreation facility, but in drought

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years the reservoir is drained to meet agricultural needs.
There are no foreseeable changes in water use.

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Recreation

Calder Reservoir is accessible from Jones Hole Road northeast of Vernal. Go east out of Vernal on 500 North, following signs to Jones Hole, Diamond Mountain, and Brown's Park. Two miles west of town, the road bends north and drops into the Brush Creek valley, then climbs for many miles to Diamond Mountain (a plateau). Seven miles after reaching the top of the plateau (and 27 miles out of Vernal), turn left on an unpaved road marked "Crouse Reservoir 5 Browns Park 15". Follow this road for two miles to the crest of a hill, then angle left at a fork in the road to Crouse and Calder reservoirs. After 4 miles or so, Calder Reservoir should be visible on the left and Crouse on the right. It is also possible to remain on the right fork of the road (to Browns Park) to Crouse Reservoir, then go west for one mile to Calder Reservoir.

Fishing is the primary function of the reservoir. It has a boat ramp and latrines, and is well stocked with fish. There are no public or private campgrounds in the area. Campers should pack out *all*/refuse. This is private land and being a guest is a privilege.

Watershed Description

Calder Reservoir is on Pot Creek, an east flowing drainage starting from Mount Lena (two miles west of US-191 at the summit) to the Green River in The Canyon of Lodore in Colorado. It is located in an area of rolling hills and flat valley bottoms. The Uintas are lower in this area, and the axis of the anticline is not a watershed boundary, having cut by the Green River and subsequently by tributaries to the river that are capturing the Pot Creek Drainage. On a geologic time scale, Jackson Draw and several other north flowing streams are on the verge of capturing Pot Creek.

Slopes in the Pot Creek drainage are not steep (30% maximum) and very little erosion is occurring. There are some mid-elevation mountains at the headwaters of Pot Creek, but these are small compared to the higher mountains several miles further west.

The watershed high point, the east peak of Mount Lena, is 2,951 m (9,147 ft) above sea level, thereby developing a complex slope of 4.3% to the reservoir. The average stream gradient of Pot Creek is 0.8% (44 feet per mile). The inflow and outflow is Pot Creek. Matt Warner Reservoir, another DWR-owned stabilized lake, is several miles upstream.

The watershed is made up of mountains and mountain valleys. Soil composition information has not been compiled by the Division of Water Quality.

The vegetation communities consist of sage-grass, pinyon-juniper, spruce-fir and aspen. The watershed receives 41 - 51 cm (16 - 20 inches) of precipitation annually. The frost-free season around the reservoir is

60 - 80 days per year.

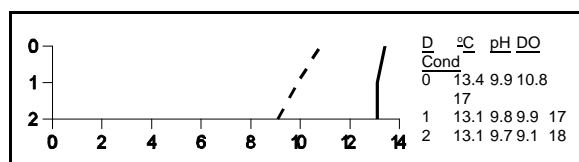
Land use in the watershed rangelands is divided between the privately owned areas (about 50%) and multiple use (rangelands and recreation) in the areas owned by the BLM and the Forest Service (about 25% each).

Limnological Assessment

The water quality of Calder Reservoir is good. It is considered moderately hard with a hardness concentration range of 88-123 mg/L (CaCO₃). The only water quality parameter that has exceeded water quality standards for defined beneficial uses of the reservoir is phosphorus. The average phosphorus concentration in 1992 in the water column was 0.085 mg/L which is more than three times the recommended pollution indicator value (0.025 mg/L). Although the concentrations of phosphorus in the reservoir is relatively high the concentration of nitrogen are usually low at the minimum detectable limits much of the time for ammonia and nitrate. The reservoir does have a moderate to high biological productivity rate and the data indicates that the reservoir is consistently nitrogen limited. The

Limnological Data		
Data sampled from STORET site: 593780		
Surface Data	1981	1992
Trophic Status	E	E
Chlorophyll TSI	-	40.52
Secchi Depth TSI	40.02	53.68
Phosphorous TSI	60.56	68.21
Average TSI	50.29	54.14
Chlorophyll <i>a</i> (ug/L)	-	2.8
Transparency (m)	4.0	1.55
Total Phosphorous (ug/L)	50	85
pH	8.6	9.7
Total Susp. Solids (mg/L)	<5	2.75
Total Volatile Solids (mg/L)	-	2
Total Residual Solids (mg/L)	-	2
Temperature (°C / °f)	16/61	14/57
Conductivity (umhos.cm)	251	183
Water Column Data		
Ammonia (mg/L)	0.1	0.03
Nitrate/Nitrite (mg/L)	0.35	0.01
Hardness (mg/L)	123	88
Alkalinity (mg/L)	121	94
Silica (mg/L)	-	1.4
Total Phosphorus (ug/L)	50	85.0
Miscellaneous Data		
DO (Mg/l) at 75% depth	7.1	9.5
Stratification (m)	2-3	NO
Limiting Nutrient	N	N
Depth at Deepest Site (m)	4.0	2.0

trophic status of the reservoir is eutrophic with reported TSI values in excess of 50 for those years monitored. The only stratification that was documented in the reservoir was in June, 1981 between 2 and 3 meters, midway through the water column. No thermocline was present on September 3, 1992 but the depth of the reservoir was only 2 meters. The reservoir has never been near capacity (12 meter depth) during any monitoring periods. Stratification may occur under conditions where more water was stored in the reservoir. It appears that one of the major criteria that affects water quality is the quantity of water stored in the reservoir. In addition to low storage the reservoir is periodically drained. Even if some water is stored in the reservoir during the winter season problems can develop. During a winter survey on March 14, 1991 a profile of the water column was made. The dissolved oxygen concentration ranged from 0.3 mg/L at the surface to 0.1 mg/L at the bottom (3.3 meters). It is evident that under these conditions that survival of fish during the winter season is limited in the reservoir to areas (inlets) where dissolved oxygen concentrations may be sufficient for fishery requirements. According to DWR stocking reports Calder Reservoir is stocked annually with 5,000 catchable and 15,000 fingerling rainbow trout (*Oncorhynchus mykiss*).



The reservoir has not been chemically treated by the DWR, but the periodic draining of the reservoir makes it unlikely that native fishes are present in any significant numbers.

On September 3, 1992, phytoplankton in the euphotic zone was as follows:

Species	Cell Volume (mm ³ /liter)	% Density By Volume
<i>Staurostrum</i> sp.	0.333	49.55
Pennate diatoms	0.267	39.64
<i>Scenedesmus quadricauda</i> var. <i>quadrispina</i>	0.044	6.61
<i>Crucigenia rectangularis</i>	0.016	2.48
<i>Oocystis</i> sp.	0.008	1.32
<i>Chlamydomonas</i> sp.	0.002	0.41
Total	0.67	
Shannon-Weaver [H']	1.07	
Species Evenness	0.59	
Species Richness	0.25	

As observed the reservoir is dominated by green algae and diatoms indicative of higher water quality than indicated by the trophic state index.

Information

Management Agencies

Uinta Basin Association of Governments	722-4518
Division of Wildlife Resources	538-4700
Division of Water Quality	538-6146

Recreation

Dinosaurland Travel Region (Vernal)	789-6932
Vernal Chamber of Commerce	789-1352

Reservoir Administrators

Division of Wildlife Resources	538-4700
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Pollution Assessment

Nonpoint pollution sources include the following: Sedimentation and nutrient loading from grazing. Litter, human waste and chemicals from recreation.

Grazing takes place throughout the watershed, but the reservoir is fenced to protect the riparian areas from domestic livestock.

There are no point sources of pollution in the watershed.

Beneficial Use Classification

The state beneficial use classifications include: boating and similar recreation (excluding swimming) (2B), cold water game fish and organisms in their food chain (3A) and agricultural uses (4).

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